

Key Statements on Climate Change Science

President Bush, Rose Garden Speech, June 11, 2002:

"My Cabinet-level working group has met regularly for the last 10 weeks to review the most recent, most accurate, and most comprehensive science. They have heard from scientists offering a wide spectrum of views. They have reviewed the facts, and they have listened to many theories and suppositions. The working group asked the highly-respected National Academy of Sciences to provide us the most up-to-date information about what is known and about what is not known on the science of climate change.

First, we know the surface temperature of the earth is warming. It has risen by .6 degrees Celsius over the past 100 years. There was a warming trend from the 1890s to the 1940s. Cooling from the 1940s to the 1970s. And then sharply rising temperatures from the 1970s to today.

There is a natural greenhouse effect that contributes to warming. Greenhouse gases trap heat, and thus warm the earth because they prevent a significant proportion of infrared radiation from escaping into space. Concentration of greenhouse gases, especially CO₂, have increased substantially since the beginning of the industrial revolution. And the National Academy of Sciences indicate that the increase is due in large part to human activity.

Yet, the Academy's report tells us that we do not know how much effect natural fluctuations in climate may have had on warming. We do not know how much our climate could, or will change in the future. We do not know how fast change will occur, or even how some of our actions could impact it.

For example, our useful efforts to reduce sulfur emissions may have actually increased warming, because sulfate particles reflect sunlight, bouncing it back into space. And, finally, no one can say with any certainty what constitutes a dangerous level of warming, and therefore what level must be avoided.

The policy challenge is to act in a serious and sensible way, given the limits of our knowledge. While scientific uncertainties remain, we can begin now to address the factors that contribute to climate change."

There are only two ways to stabilize concentration of greenhouse gases. One is to avoid emitting them in the first place; the other is to try to capture them after they're created. And there are problems with both approaches. We're making great progress through technology, but have not yet developed cost-effective ways to capture carbon emissions at their source; although there is some promising work that is being done.

Quotes from the U.S. Climate Action Report 2002:

"One of the weakest links in our knowledge is the connection between global and regional predictions of climate change. The National Research Council's response to the President's request for a review of climate change policy specifically noted that fundamental scientific questions remain regarding the specifics of regional and local projections (NRC 2001). Predicting the potential impacts of climate change is compounded by a lack of understanding of the sensitivity of many environmental systems and resources -- both managed and unmanaged -- to climate change." (Overview, page 6)

"While current analyses are unable to predict with confidence the timing, magnitude, or regional distribution of climate change, the best scientific information indicates that if greenhouse gas concentrations continue to increase, changes are likely to occur. The U.S. National Research Council has cautioned however, that 'because there is considerable uncertainty in current understanding of how the climate system varies naturally and reacts to emissions of greenhouse gases and aerosols, current estimates of the magnitude of future warnings should be regarded as tentative and subject to future adjustments (either upward or downward).' Moreover, there is perhaps even greater uncertainty regarding the social, environmental, and economic consequences of changes in climate." (Overview "The Science" box, page 4)

"Greenhouse gases are accumulating in Earth's atmosphere as the result of human activities, causing global mean surface temperature and subsurface ocean temperature to rise. While the changes observed over the last several decades are due most likely to human activities, we cannot rule out that some significant part is also a reflection of natural variability." (Overview, page 4).

"In its June 2001 report, the Committee on the Science of Climate Change, which was convened by the National Research Council (NRC) of the National Academy of Sciences, concluded that '[h]uman-induced warming and associated sea level rises are expected to continue through the 21st century.' The Committee recognized that there remains considerable uncertainty in current understanding of how climate varies naturally and will respond to projected, but uncertain, changes in the emissions of greenhouse gases and aerosols." (Chapter 6, page 81)

"These assessment studies recognize that definitive prediction of potential outcomes is not yet feasible as a result of the wide range of possible future levels of greenhouse gas and aerosol emissions, the range of possible climatic responses to changes in atmospheric concentration, and the range of possible environmental and societal responses." (Chapter 6, page 82)

"Because of these ranges and their uncertainties, and because of uncertainties projecting potential impacts, it is important to note that this chapter cannot present absolute probabilities of what is likely to occur. Instead, it can only present judgments about the relative plausibility of outcomes in the event that the projected changes in climate that are being considered do occur." (Chapter 6, page 82)

"Use of these model results is not meant to imply that they provide accurate *predictions* of the specific changes in climate that will occur over the next hundred years. Rather, the models are considered to provide plausible *projections* of potential changes for the 21st century. For some aspects of climate, the model results differ. For example, some models, including the Canadian model [used in this Assessment] project more extensive and frequent drought in the United States, while others, including the Hadley model [the other model used in the Assessment] do not. As a result, the Canadian model suggests a hotter and drier Southeast during the 21st century, while the Hadley model suggests warmer and wetter conditions. Where such differences arise, the primary model scenarios provide two plausible, but different alternatives." (Chapter 6, page 84)